

# High Mortality Rates in Native Hawaiians

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*Native Hawaiians continue to have higher mortality rates than do other ethnic groups in Hawaii. This discrepancy becomes even more pronounced when rates are calculated separately for full-Hawaiians versus part-Hawaiians versus all races. In an exploratory discussion of these data, a group of Native Hawaiian physicians recommend greater attention be given to Native Hawaiian values and participation in health care delivery, increasing access to services, and further research.*

## Introduction

Compared to other ethnic groups, Native Hawaiians continue to have higher rates of mortality for almost every major cause of death.<sup>1-3</sup> Few public reports about health, however, disaggregate full-Hawaiians and part-Hawaiians. Rather, an assumption is made that full- and part-Hawaiians share the same poor health status.<sup>4-5</sup>

An exception was a landmark paper by Look<sup>6</sup> that presented age-adjusted death rates per 100,000 for three groups—full-Hawaiians, part-Hawaiians, and all races—for the years 1910, 1920, 1930, 1940, 1950, 1960, 1970, and 1980. This study found at each decade the major causes of death were similar for all three groups but the rates of death were substantially higher for full-Hawaiians. Specifically, death rates from infectious diseases were high for all three groups in the early part of the century, but were at least twice as high for full-Hawaiians compared to those of part-Hawaiians and all races (the total population). After 1940, death from infectious causes declined and death from chronic diseases increased for all groups, but again the rates were considerably higher for the full-Hawaiian group for all causes of death studied. In the decade years 1950 to 1980, differences in the mortality rates between part-Hawaiians and all races for all causes of death were not statistically significant. In addition, the

1980 data suggested a lessening in the disparity between full-Hawaiians and the other two groups.<sup>6</sup>

Since Look's 1982 report, public attention to the health status of Native Hawaiians has increased. For example, the 1985 publication of the *E Ola Mau Native Hawaiian Health Needs Study Report*<sup>7</sup> was followed by the enactment of the Native Hawaiian Health Professions Scholarship Program,<sup>8</sup> the Native Hawaiian Health Care Act of 1988,<sup>9</sup> and the Native Hawaiian Health Care Improvement Act of 1992.<sup>10</sup> These federal mandates established Native Hawaiian Health Systems on the major islands (Oahu, Hawaii, Kauai, Maui, and Molokai) through which health education, health promotion, disease prevention, and some traditional healing services are provided. The purpose of the scholarship program is to increase the number of Native Hawaiians in the health professions, with recipients agreeing to *pay back* their scholarships by working in designated shortage areas.

The current study was undertaken to: 1) update and expand the 1982 Look report by adding in the data from 1990 and 2) investigate if changes in mortality have occurred with this increased attention and programming in the area of Hawaiian health. Results of the updated mortality analysis for selected causes were shared with six Native Hawaiian physicians for the purpose of recording their discussion, reactions, and recommendations. As these physicians had been involved in the Hawaiian health care initiatives, they hoped to see a continued decrease in the discrepancy in mortality rates among the groups. Highlights of these statistical findings and a summary of the physicians' responses are presented.

## Methods

Mortality rates were calculated as follows. Numerator data were derived from Hawaii Department of Health computer files of death records. Requested were the number of deaths by major causes and for all causes for full-Hawaiians, part-Hawaiians, and all races for 5 years around each decade year (eg, for 1990, numbers of deaths were obtained for 1988 to 1992), then divided by 5 to calculate the mean number of deaths for 1990. This procedure was done to minimize the effect of yearly variation in small numbers of deaths within categories. As in all states, the underlying cause of death is determined by the physician, while ethnicity is among the personal facts about the decedent that are obtained and recorded by the funeral director.<sup>11-12</sup>

Denominator data are based on the U.S. Census but have been adjusted by the Hawaii Department of Health to reflect the ethnic distribution determined through the state's health surveillance program, which collects more detailed data on ethnicity than does the U.S. Census. In the surveillance program, a

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respondent's ethnicity is determined through an algorithm based on the ethnicity of both parents; a person is classified as full-Hawaiian if both parents were Hawaiian and part-Hawaiian if either parent had any Hawaiian blood. Using this method, in 1990 about 9,019 (0.8%) Hawaii residents were full-Hawaiian and about 201,071 (18%) were part-Hawaiian.<sup>13</sup> This compares to 138,742 Native Hawaiians (about 30% fewer) identified by the U.S. Census in that year.<sup>14</sup>

As in the Look study, mean mortality rates were age-standardized to the 1950 population, using the indirect method, to control the effects of changing age structure over time, thus allowing comparison of rates across groups and over time. Rates were expressed per 100,000. For each mortality rate, the 95% confidence intervals were calculated based on a method developed by Mantel that is appropriate for Poisson-type distributions such as death.<sup>15-16</sup> The confidence intervals provide an estimate of uncertainty in the rates; in general, the smaller the number of deaths in a given category, the larger the uncertainty about the exact death rate and, hence, the larger the confidence interval. Differences among groups or across time are considered statistically significant when confidence intervals for the mortality rates do not overlap.

## Findings

Mortality rates for full-Hawaiians, part-Hawaiians, and all races from 1910 to 1990 are provided in Figure 1 (all causes of death), Figure 2 (heart disease), and Figure 3 (malignant neoplasms). To simplify the figures, the 95% confidence limits are not shown; for 1960 to 1990, however, rates and 95% confidence intervals are provided in Table 1. A complete set of findings is provided in a related technical report.<sup>17</sup>

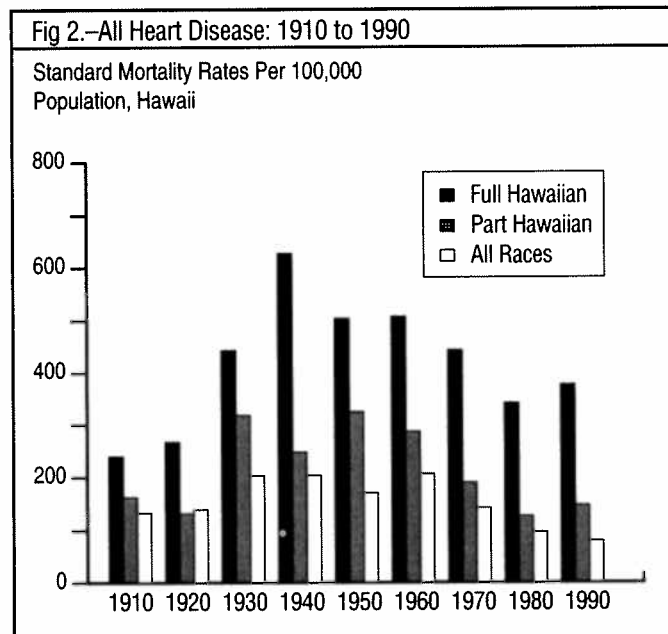
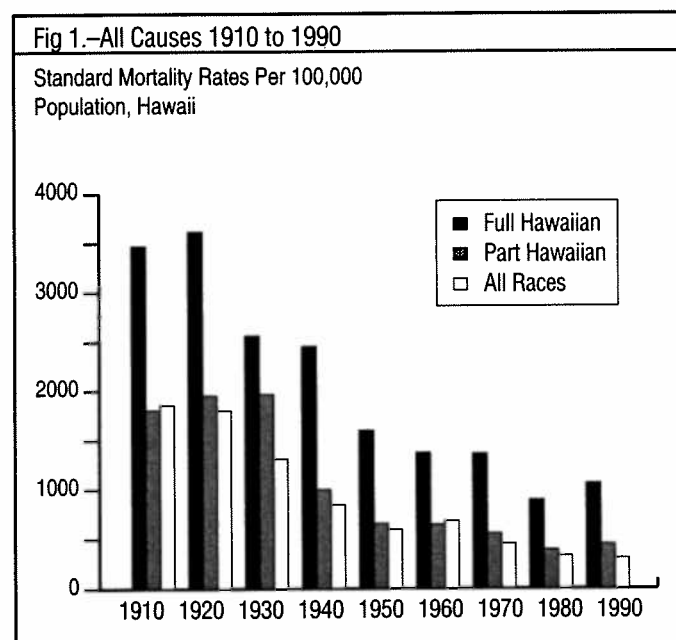
In general, the findings suggest that, in almost every decade, mortality rates for full-Hawaiians were significantly higher than for the other groups. Although the mortality rates for part-Hawaiians and all races seem to have converged in 1960, they have diverged since then with part-Hawaiians exhibiting significantly higher mortality rates than all races.

Specifically, Figure 1 shows that all-cause mortality rates declined for all groups over the century. Even between 1960 and 1990, the declines in rates were significant for all groups. At all decades, however, the death rates for full-Hawaiians were significantly higher than for the other two groups. In contrast to the downward trend of mortality rates for all groups between 1960 and 1980, the 1990 rates for full- and part-Hawaiians are higher while the mortality rate for all races is continuing to decrease (although differences between 1980 and 1990 rates were not statistically significant for any group). In addition, the 1990 all-causes mortality rate for full-Hawaiians was 2.4 times that of part-Hawaiians and 3.5 times that for all races. The 1990 all-causes mortality rate for part-Hawaiians was 1.5 times that of all races.

Figure 2 shows that mortality rates for heart disease tended to increase until the middle of the century and then decline for all groups. Between 1960 and 1990, the over-time declines in rates were significant for all groups. In 1990, however, the mortality rate for heart disease for full-Hawaiians was still 2.5 times that for part-Hawaiians and 4.7 times that for all races, while the rate for part-Hawaiians was 1.9 times that of all races.

Figure 3 shows that mortality rates from malignant neoplasms have risen for all groups since 1910, but especially for part- and full-Hawaiians. Since 1960, a significant decline in cancer mortality rates was seen only for the all races group. For the full- and part-Hawaiian groups, 1990 cancer mortality rates are not significantly different from 1960 rates. In addition, the 1990 cancer mortality rate for full-Hawaiians was 2.1 times that of part-Hawaiians and 3.2 times that of all races, while the rate for part-Hawaiians was 1.5 times that of all races.

Table 1 shows the actual rates and confidence intervals for the major causes of death for the decade years 1960 to 1990. It also provides more detail on cancer deaths. Specifically, 1990 mortality rates for breast cancer were 2.6 times higher for full-Hawaiians than for the other two groups (which exhibited similar rates). No group, however, experienced significant declines in breast cancer mortality between 1960 and 1990. For



lung cancer, mortality rates for full-Hawaiians were 2.3 times higher than for part-Hawaiians and 4.3 times higher than for all races. Lung cancer mortality rates have increased since 1960 for all groups, but only significantly so for the all-races group. For colon/rectal cancer, 1990 mortality rates were significantly higher for full-Hawaiians than for all races; the rate declined significantly since 1960 only for the all-races group.

### Physician Response

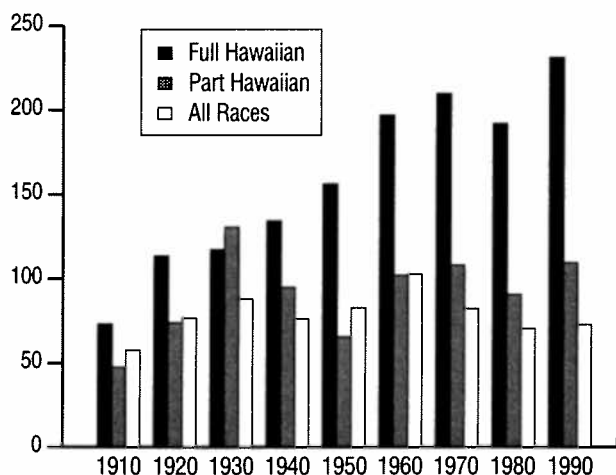
Increased local and national awareness of Native Hawaiian health parallels heightened involvement of Native Hawaiian health professionals and paraprofessionals in research as well as in the development of health care systems that provide adequate, appropriate, and acceptable health care for Native Hawaiians. This involvement is critical and presumes that cultural knowledge will be used in the development and implementation of services.<sup>18</sup> Aligned with the belief that Native Hawaiians' capacity for self-determination is predicated on the extent and quality of their participation, the findings of this study were shared with six Native Hawaiian physicians to elicit their reaction.

### Method

Six Native Hawaiian physicians participated in the discussion that responded to the updated mortality data and generated recommendations for future direction. They represented a variety of professional settings (urban, rural, and institutional), organizational affiliations, and areas of expertise. In terms of medical specialty, there were two internists, a general practitioner, an oncologist, a hematologist, and a non-practicing physician with a specialty in medical informatics. Three of the six physicians are faculty at the University of Hawaii John A. Burns School of Medicine. All six physicians have research expertise in the area of Native Hawaiian health and are affiliated, either through board membership or as a contributing consultant and/or practitioner, to one or more of the five Native Hawaiian health care systems. Five of the physicians have served large Hawaiian populations through private practice. The physician discussion group was held in Kaunakakai, Molokai on October 28, 1994.

Fig 3.—All Malignant Neoplasms: 1910 to 1990

Standard Mortality Rates Per 100,000  
Population, Hawaii



### Response to Findings

Upon presentation of the mortality data update, the six physician participants expressed concern and disappointment about the disparate rates in the mortality of Native Hawaiians when compared to all races in the Hawaiian Islands. The dramatic and persistent disparity in the rates of full-Hawaiians over the other two groups, coupled with an apparently increasing disparity

Table 1.—Mortality Rates and 95% Confidence Intervals (CI) for 1960 to 1990

		Full-Hawaiian	Part-Hawaiian	All Races
<b>All Causes</b>				
1960	Rate	1,370.0	643.1	679.5
	CI	1,287.1-1,458.4	603.9-684.2	638.1-723.0
1970	Rate	1,360.3	555.5	454.4
	CI	1,199.8-1,542.6	512.1-602.1	426.7-483.5
1980	Rate	892.1	391.9	331.9
	CI	774.3-1,026.8	363.7-422.5	311.7-353.2
1990	Rate	1,062.7	449.6	307.4
	CI	947.9-1,191.3	420.8-478.4	288.7-327.1
<b>Heart Disease</b>				
1960	Rate	508.5	237.7	206.8
	CI	459.8-549.2	217.5-259.8	194.2-220.1
1970	Rate	443.2	190.0	142.9
	CI	358.6-549.6	162.2-222.4	134.2-152.1
1980	Rate	340.8	125.8	96.5
	CI	275.7-422.6	110.9-142.6	90.6-102.7
1990	Rate	375.9	146.8	79.2
	CI	313.1-451.1	130.9-164.4	74.4-84.3
<b>Malignant Neoplasms</b>				
1960	Rate	197.3	102.1	102.7
	CI	171.3-227.1	90.0-115.8	96.5-109.3
1970	Rate	210.2	108.2	82.5
	CI	150.1-285.9	87.6-134.2	76.9-88.4
1980	Rate	192.3	90.8	70.5
	CI	140.2-257.7	76.7-107.5	66.2-75.0
1990	Rate	231.6	109.6	72.9
	CI	181.8-294.1	96.7-124.3	68.4-77.5
<b>Malignant Neoplasms of the Breast</b>				
1960	Rate	16.2	11.4	5.7
	CI	8.8-27.2	7.6-16.6	4.8-6.8
1970	Rate	11.3	6.5	4.9
	CI	2.3-33.0	2.4-14.1	3.6-6.6
1980	Rate	15.0	10.4	5.7
	CI	3.1-43.7	5.8-17.2	4.6-7.1
1990	Rate	19.9	7.5	5.8
	CI	6.5-46.4	4.1-12.6	4.8-7.0
<b>Malignant Neoplasms of the Lung/Bronchial</b>				
1960	Rate	24.6	16.4	11.5
	CI	8.0-57.4	7.5-31.2	8.9-15.0
1970	Rate	56.1	23.6	15.5
	CI	28.0-100.4	14.2-36.8	13.2-18.2
1980	Rate	57.8	25.5	15.6
	CI	31.6-97.1	18.2-34.6	13.9-17.5
1990	Rate	77.2	33.0	17.9
	CI	48.9-115.8	25.9-41.9	16.3-19.7
<b>Malignant Neoplasms of the Colon/Rectum</b>				
1960	Rate	15.5	8.3	12.5
	CI	3.2-45.3	2.3-21.2	9.8-15.9
1970	Rate	4.0	6.5	9.7
	CI	0.1-22.3	2.1-15.1	7.9-11.8
1980	Rate	9.0	6.7	7.5
	CI	1.1-32.5	3.2-12.3	6.3-8.9
1990	Rate	16.5	9.8	7.8
	CI	18.8-42.2	5.8-15.5	6.8-8.8

between part-Hawaiians and all races, was disturbing to the group and spurred discussion around three critical areas that have an impact on the disparity: Native Hawaiian attitudes about health, accessibility of services, and the need for further research.

## Attitudes

The discussion highlighted several attitudes and behaviors that the physicians said were commonly found among many of their Native Hawaiian patients, including: 1) a fatalistic attitude about conditions such as diabetes, cancer, heart disease, and obesity, often coupled with an expressed powerlessness to control or change the course of a disease; 2) the belief that Hawaiians will not be treated with respect in existing mainstream services; 3) a distrust of Western approaches to health care and treatment; 4) a preference among many Native Hawaiians to include, and in some cases rely solely on, traditional Hawaiian healing practices; and 5) dislike of treatment that focuses on the individual, versus the individual in relationship to his or her family and social support system.

Understanding these behaviors and attitudes requires an appreciation of the traditional Hawaiian values that underpin Hawaiians' concepts of illness and health (Table 2). These include *mana* (interrelatedness of all things), *lokahi* (harmony and unity), *ohana* (extended family and social supports), and *kokua* (mutual help and cooperation). These values affect health-seeking behaviors and must be taken into account in order to

develop and provide services that are sensitive and appropriate.<sup>18</sup> However, they are often in conflict with Western values (specialization, competition, materialism, economic gain, and emphasis on the individual) and affect the attitudes and health-seeking behaviors of Native Hawaiians who must negotiate a Western system of health care.

Physicians cited the fatalistic attitude often found among their patients, notably those with cancer. For example, when a physician asks groups of women in Waianae if they know someone who has died of breast cancer, almost everyone in the group raises her hand. "It becomes an accepted part of their existence." The fatalistic attitude frequently leads to delayed diagnosis and nonacceptance of recommended treatment and, because of this, outcomes for cancer are often negative, which further casts doubt on Western medical approaches. Those who do accept treatment are often at an advanced stage of illness and are more likely to die of the cancer, rather than survive. One participant noted:

These (Native Hawaiian) women are a lot braver than other patients. They are not afraid. They have seen other people go through treatment and die (of cancer). They have seen the side effects of chemotherapy, and they are often ready to *check out* (accept death) when diagnosed with cancer.

In treatment for other conditions, such as obesity, diabetes, and heart disease, physicians also noted a tendency among Native Hawaiian patients not to comply fully with treatment or to refuse treatment altogether. For example, common responses of patients to treatment recommendations include "screw it," "no matta, goin' die," and "nobody goin' cry for me." Those who have seen their loved ones suffer through chemotherapy often respond, "I'd rather die of a heart attack than something like cancer."

During this discussion, each physician noted the importance of traditional healing practitioners and practices for many of his or her Native Hawaiian patients. Some of the participants noted that Native Hawaiian women patients were especially likely to seek and use alternative, non-Western, modes of treatment such as *laau lapaau* (use of herbs) or *laau kahea* (use of prayer), resulting in a later diagnosis and/or resistance to Western treatment recommendations. "Often, they set themselves up by thinking they must choose one (type of treatment) or the other, rarely using traditional and Western treatments simultaneously."

Many practitioners recommend life-style changes for Native Hawaiians (eg, in the areas of diet, exercise, and substance abuse). Those programs that focus on the individual, separately from his or her *ohana* and environment, however, are not compatible with the community-based orientation of the culture and have poor outcomes. A notable and successful exception is the traditional Hawaiian diet program in which participants eat meals together, discuss health and cultural issues, and provide mutual support over an extended period of time.<sup>19-20</sup>

The physicians also shared that many of their Native Hawaiian women patients delayed seeking medical care or committing to recommended follow-up because it would interfere with their immediate obligations to care for their families. In addition, Native Hawaiians are reluctant to burden their family members with the inconvenience of treatment, medical appointments, or witnessing their pain and suffering. Another participant noted, however, that the value to place family and others first, before the needs of the individual, can be incorporated into culturally

Table 2.—Native Hawaiian Values

Value	Meaning
<i>Mana</i>	Native Hawaiians believe that all things, animate and inanimate, are interrelated by a creative force that is the divine power of the gods. A Hawaiian's oneness with spirits and gods might be viewed as a part of the natural consciousness for the Hawaiian, a kind of second sense which encompasses every phase of sensory and mental consciousness.
<i>Lokahi</i>	Native Hawaiians believe in harmony and unity. Lokahi has been described as ways to live in unity or at peace with oneself, the family, the gods, and the land. Thus, it is important to live in harmony with others, to be respectful of the natural environment, and to acknowledge that spirits and gods are an integral part of nature.
<i>Ohana</i>	Ohana refers to the family at-large, which may include the family, the extended family and others who are regarded with affection. Within the ohana there are feelings of unity, shared love, shared responsibility, and shared material goods. A predominate social characteristic of a Native Hawaiian is a tendency to see oneself in relationship to others, as a contributing group member.
<i>Kokua</i>	Kokua refers to mutual help and cooperation, which contributes to group unity by fostering cooperation, interdependence, and reciprocity. The focus is on the group rather than the self. Processes seen as benefitting others are more acceptable than those that lead to personal gain.

competent health programs for women. For example, a 1989 breast cancer screening project encouraged 200 women to participate by focusing on the benefit of their participation for other Native Hawaiian women and on the need to prevent illness because of the impact it would have on the family. Nearly 100% of these women followed-through by getting a screening mammogram.<sup>21</sup> Similarly, the Waianae Cancer Research Project utilizes a woman's extended family, social network, and environment as vehicles to educate and promote breast and cervical cancer screening (Banner RO, et al, unpublished data, 1994).

While the data presented significantly higher death rates for full-Hawaiians compared to part-Hawaiians, participants did not think full-Hawaiians were more likely than part-Hawaiians to subscribe to these cultural values or to follow traditional Hawaiian healing methods. The extent of assimilation of the client appeared to be a stronger determining factor in the belief and incorporation of Hawaiian values. A physician participant described three subgroups of Native Hawaiians based on extent of assimilation: 1) individuals who have almost fully adopted the Western cultural norms and behaviors; 2) a sizable group of individuals who consider themselves to be bicultural; and 3) a small but growing group of rural, self-reliant nationalists. The latter two groups were seen to be more likely to resist Western notions of health, illness, and treatment. The first group, the more assimilated Native Hawaiians, tended to have higher incomes, to live in urban areas with better access to health care, and to have more positive attitudes toward Western medicine.<sup>2</sup>

Participants were fully aware that Native Hawaiians have historically been underrepresented in participation in health prevention and treatment services.<sup>7</sup> However, they were also keenly aware that this low rate of participation has resulted in Hawaiian populations being labeled by providers as, "difficult-to-reach, non-compliant, and/or uncaring about their health." This *blame-the-victim* attitude has resulted in little effort by practitioners and organizations to provide health services in ways that are more responsive to the needs and values of Native Hawaiians. Mokuau notes that although the concept of culturally appropriate services are not new among other people of color, such as American Indians and African Americans, it is a relatively new idea to offer culturally responsive services to Native Hawaiians.<sup>18</sup> The discussion group agreed strongly that this was a significant contributor to the disproportionately high mortality rates exhibited by Native Hawaiians. While culturally relevant services are now being implemented in different areas, efforts are too new to affect mortality rates.

## Accessibility

The second focus of the discussion centered around the lack of access to health care services by Native Hawaiians. Inability to receive services, whether because of geographic isolation and/or cost, has been a major barrier for Native Hawaiians and has contributed to low participation in health services and poor health.<sup>3,22</sup>

Geographically, many Hawaiians are concentrated in rural communities that are distant from and separated by water from tertiary care facilities, eg, Waianae, Waimanalo, and the North Shore on Oahu, Hana, Molokai, West Kauai, and several districts on the island of Hawaii. In these areas, primary care is available but limited to a few providers, while consistent specialty care is not available at all. In addition, aggressive, leading-edge treatment modalities, such as those used in clinical trials, are rarely offered in these locations. Screening programs that are

taken to the community and cosponsored by the community have been successful, but expecting individuals to travel far distances by themselves for screening activities is unrealistic. In reality, individuals in these rural communities must commute long distances by car or plane to access most health care.

Acknowledgment of specific geographic concentrations of Native Hawaiians was one of the motivations to decentralize the Native Hawaiian health care systems, rather than having them headquartered in Honolulu. While it is too early in the systems' development to determine their effectiveness on health status, there have been clear demonstrations on their ability to reach the rural Hawaiian populations. A physician shared that *Na Puu wai*, the system serving Molokai, *flies in* nutrition education and counseling services, prostate cancer screening and education, oral hygiene education and screening, and other services that are currently unavailable on the island. These programs have had a high response rate but remain tenuous because they are dependent on professionals who live on other islands, mainly Oahu.

Inadequate insurance coverage presents another significant barrier. Private insurance provides little coverage for health education and screening. The state's QUEST program provides for some screening, however, reimbursement is low and confusion over physician assignment still exists. Some physicians pointed out that perhaps in the long run the trend toward managed care will provide greater access to health education and screening, but the effects of this movement will not be seen for a while.

In addition to geographic isolation and inadequate insurance coverage, physicians noted that Native Hawaiians share other characteristics of a disadvantaged population. For example, they are more likely to be unemployed, to have a low educational attainment, to live in households headed by women, to be overrepresented in service occupations and farming, and to have the lowest income levels.<sup>2,3</sup> That these factors have a negative impact on health and longevity is already well known among health care providers and researchers.<sup>23-24</sup>

In terms of the differences in mortality rates between full- and part-Hawaiians, physicians noted that Hawaii has historically pursued a strategy to obtain funding for Hawaiians as a whole, rather than by subgroup. Differential access to services by the two groups, however, may be a reason for differences in mortality rates, as full-Hawaiians are even more likely than part-Hawaiians to be concentrated in the isolated and rural parts of the state.

## Further Research

Finally, the Native Hawaiian physicians pointed out several areas for further investigation. First, they noted that the mortality findings of this study were based on retrospective analysis. They recommended that prospective risk-factor studies be undertaken to test more accurately the impact of specific intervention strategies.

Physician participants stressed the potential importance of genetic research, which could reveal genetic predisposition toward certain diseases. For example, recent research has shown the existence of *promoter* and *suppressor* genes and that abnormalities in either could lead to cancer. Advancing our understanding of genetic markers may lead to better targeting of screening and treatment efforts. This type of research could help sort whether the high mortality rates for full- and part-Hawaiians have a basis in genetics or are solely attributable to environmental and social conditions.

The physicians also expressed the importance of sharing the information of this study with full-Hawaiians. They said full-Hawaiians are *cultural treasures* and they would be the most appropriate to respond and share their understanding and perceptions of health, illness, and treatment. At the same time, recommendations for appropriate delivery of health care services can be solicited. For example, physicians thought it would be good to know how existing services could be made more culturally competent and how traditional healing and Western medical approaches could be used in tandem to increase access and improve outcomes.

## Discussion

Native Hawaiian physicians were disappointed but not surprised by the finding of continued, and perhaps increasing, discrepancy in mortality rates between Native Hawaiians and all races in Hawaii. The physicians have seen these differences in their practices and have supported the efforts of the Native Hawaiian Health Care Acts to improve delivery of health services and increase the number of Native Hawaiian providers. They recommended more attention to the possible geographic, environmental, cultural, social, and genetic causes behind the differences in full-Hawaiian and part-Hawaiian rates. They did not, however, advocate increasing attention to the health of full-Hawaiians at the expense of part-Hawaiians, rather they said all Native Hawaiians needed increased services and opportunities.

Methodologically, the study was constrained by a number of issues. First, there is a degree of uncertainty about the accuracy of *cause of death*. Our physician respondents noted that many patients have multiple health problems and that the cause of death on the death record may not provide an accurate reflection of health status. Second, the method of reporting and recording ethnicity for population tracking has changed over the decade. For example, prior to statehood Hawaii census activities allowed residents to designate their ethnicity as part-Hawaiian. In 1970, however, the U.S. Census omitted this category which resulted in a reduction of more than 30,000 Native Hawaiians compared to the 1960 census despite the fact that Hawaii's local birth and death record statistics indicated a gain of more than 40,000 Native Hawaiians in the same time period.<sup>25</sup> Referred to as a *paper genocide*, this single act casts the 1970 denominator numbers into doubt. Since then, the Hawaii Department of Health has adjusted the U.S. Census figures using ethnicity distribution information gathered through its health surveillance program. Also since 1970, pride in Hawaiian heritage has increased, resulting in an increased likelihood that individuals with some Hawaiian blood will identify themselves as part-Hawaiian rather than some other ethnicity. In addition, the number of full-Hawaiians is decreasing as these individuals marry non-full-Hawaiians. These factors create a third problem, that of small numbers of deaths in some categories, especially for the full-Hawaiian population. This increases the confidence intervals and, thus, the uncertainty about the exact mortality rate making it harder to find significance in cross-group and over-time differences. To compensate, most investigators collapse full- and part-Hawaiians into a single category; however, this only lessens, but does not erase, the disparity between Native Hawaiians and all races in mortality.

The study of comparative health status in Hawaii can be enhanced by other means. First, mortality rates can be calculated for an additional group—all other races. This study is already underway by the authors and will most likely show even larger

differences in mortality between part-Hawaiians and the remaining races in Hawaii. A related study is currently calculating the 1990 life tables for Hawaii's major ethnic groups to complement earlier work by local demographers (H. Yang, unpublished data, 1995).<sup>26-27</sup>

## Conclusion

As a follow-up to the 1982 Look report, the present study confirms that full-Hawaiians continue to be at greater risk of death from all causes than are part-Hawaiians and all races in Hawaii. The findings also suggest that, while mortality rates for part-Hawaiians are significantly lower than for full-Hawaiians, they are still significantly higher than for all races. In considering these data, Native Hawaiian physicians suggested a number of strategies: 1) increase understanding of cultural values, behaviors, and practices and their impact on health; 2) bring Native Hawaiians into the process in order to plan, design, and deliver services that better *fit* traditional Native Hawaiian values and practices; 3) target services to communities with high concentrations of Native Hawaiians, especially full-Hawaiians; 4) support exploration of genetic basis for disease; and 5) continue to refine and update health status statistics other than mortality to measure progress.

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